

## Systematic Review

# Community-based transmission of hepatitis C in India: a systematic review

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## ABSTRACT

To analyze the transmission of hepatitis C available studies differentiate state/province from the Indian region. In this review it has been described that there is strong association among the factors responsible for hepatitis C virus (HCV) transmission and community-based complex intervention within public health. Total 25 most relevant articles included in this review for Uttar Pradesh, Punjab, Tamil Nadu, Haryana, Odisha, West Bengal, Uttarakhand, and Gujarat. This systematic review followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. The general concepts and topics covered by PRISMA are all relevant to any systematic review. All articles published before September 2020 that the electronic databases used in this search needed to draw content from the fields of tropical medicine, infectious disease, gastroenterology, sexually transmitted disease, communicable disease, family medicine physicians, public health and hepatology. The respondent population was 104776 categorised into five major groups; general population, underprivileged population, associated risk patient, risk behavior group. We investigated an effective cluster, and random population from various locations, prevalence in community groups. Recommendation of this review is to develop a standardized public health structure between primary health-care providers in rural and urban populations, prevent infected blood transmission and proper screening of high-risk groups.

**Keywords:** Community transmission, Hepatitis C virus, Hepatitis C in India, Risk population

## INTRODUCTION

Hepatitis C virus (HCV) infection is a leading community health problem globally. The virus infects approximately 3% of the world population, placing approximately 170 million people at risk for developing liver cirrhosis and hepatocellular carcinoma.<sup>19</sup> World Health Organization (WHO) has estimated that there are 10-24 million populations living with active HCV infection in India and seroprevalence of HCV among healthy population estimated, 0.09 to 2.02% in India.<sup>5</sup> HCV is the Principle cause of chronic necroinflammatory and neoplastic liver disease in the developing countries of Asia and Africa; it's emerging rapidly as an infection warranting attention.<sup>3</sup> According to the WHO, red cross and red crescent societies, two-thirds of developing countries have not

followed screening of donated blood and blood products for the presence of HCV.<sup>10</sup>

Transmission in the community through patients and health care providers, including unlicensed practitioners, pharmacists, and even some doctors, popularly considered medical injections a routine service provided during health care visits. The prevalence of active HCV infection in some of these transfusion centers was as high as 81%, because the South Asian countries, including India, have been derived by voluntary and paid blood donors.<sup>3,4</sup> HCV infection varies considerably from country to country, probably because of cultural factors and social habits that influence HCV transmission. Transfusion transmitted infections (TTIs) are a major problem associated with blood transfusion practices.<sup>2</sup> The main association

between the prevalence of HCV infection and the known risk factors find the several study i.e. blood transfusion, intravenous drug abuse, multiple sexual partners, and homosexuality.<sup>8</sup> The use of glass syringes correlated with HCV infection in rural parts of India and also the majority of primary health care providers in the villages are individuals without standard medical training. In recent years, most new HCV infection has been attributed to injection drug use in developed and developing countries, the city of Chennai over two-thirds of the general population reported receiving at least one injection in the past six months, averaging four injections per year.<sup>10</sup> The indications for injections include several nonspecific symptoms, such as colds, fatigue, dizziness, myofascial pain, diarrhea, abdominal pain, and fever.

A five year study conducting by Garg et al in Delhi find the 2% hepatitis C with symptoms of gynecological morbidity were reported by 88% women, the most individuals are infected by vertical transmission or in early childhood.<sup>6</sup> Viral hepatitis during pregnancy is associated with a high risk of maternal complications has been reported as a leading cause of maternal mortality in the community.<sup>5</sup>

Health education to the people regarding these modes of transmission of the virus may prove to be useful preventive interventions in these developing countries in this review; we also analyzed cause of the transmission in community-based public health practices among HCV infections.

## METHODS

This systematic review followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines since the general concepts and topics covered by PRISMA are all relevant to any systematic review. For the specific objective of the systematic review reported by in this article, the following research questions were considered – What are the main sources of transmission? What is the most affective factor for transmission? How much structure effectiveness for prevention and control? What is the relationship others intervention?

All articles published before September 2020 that the electronic databases used in this search needed to draw content from the fields of tropical medicine, infectious disease, gastroenterology, sexually transmitted disease, communicable disease, family medicine physicians, public health and hepatology.

Due to having to incorporate this variety of research fields, the search strategy was carried out in four interdisciplinary databases: Google Scholar and PubMed database from the National Center for Biotechnology Information. The database searches used to identify and document the articles presented in this review were current as of September 2020. For additional information, we also searched the websites of WHO, CDC and Ministry of Health.

## RESULTS

This systematic review followed the guidelines of the PRISMA and Figure 1 presents the respective flowchart. Total 27635 articles from the initial search on PubMed and Google scholar customize range January 1995 to September 2020 of publication with English language. Publish article search by title and for the screening phase 26354 articles identified without duplication from all database searches. Step 2 of abstract screening identified 1508 article filters, the articles without abstracts (46 articles). Based on abstract are not related to transmission of HCV (678 articles). Afterward, the abstracts of the remaining 830 articles were analyzed and it was concluded that 180 articles were related to community-based transmission of hepatitis C. However, of these 180 articles, 650 articles were excluded because they are related disorder conditions (e.g. hepatocellular disease, liver disorder, others form of hepatitis), they are not specifically related to the health conditions of the individuals, and 56 articles were excluded because they are related to community transmission in India, but do not consider a public health perspective. Finally 25 most relevant articles from 9 state/provinces were included in this systematic review (Figure 1).

Table 1 summarize all 25 relevant studies, in all studies 17 were find cross sectional study and 8 cohort-study design. All studies were used different tools for population sample collection, through questionnaires and biological sampling. Each study combined measure in two types 1: state-wise; nine states, and group-wise; five major groups, high prevalence recorded in behavioral risk group (Table 2). Many studies reported an association between injections drug user (IDU), female sex workers (FSW), men sex with men (MSM) and HCV, and some study reported associated risk patient;  $\beta$ -thalassemia, visceral leishmaniasis, jaundice, dialysis, three studies combined measure 12% prevalence in pregnant women, and also reported slum population and primitive groups with 6% prevalence (Table 2).<sup>1,4,8,14-19,20,22,23</sup>

**Table 1: Summary of studies community transmission in different state.**

Author (citation)	Year of data collection	Study site	Study design	Study population	Age group (years)	Study duration (months)	Conclusion
Chowdhary et al <sup>3</sup>	1999	West Bengal	CCS	2973	0 to $\geq 60$	10	Prevalence of HCV infection reported lower than in industrial countries of the west, the entire

Continued.

Author (citation)	Year of data collection	Study site	Study design	Study population	Age group (years)	Study duration (months)	Conclusion
							reservoir of infection is important and incorporates public health measures, as well as health education to limit the magnitude of the matter
<b>Garg et al<sup>6</sup></b>	2000	New Delhi	CCS	446	15-45	52	The prevalence of hepatitis C (2%), detected within the study and a transparent indication of unfold RTIs/STIs issue for transmission
<b>Kar et al<sup>8</sup></b>	2009	Odisha	CSS	1765	0 to $\geq 60$	36	This study reportable a high prevalence of HCV infection within the primitive social group teams compared with the national situation that wants public health attention
<b>Marx et al<sup>10</sup></b>	2001	South India	CSS	1947	18-40	04	Sexual transmission of HCV infection is also expedited by lesion STIs and male-male sexual practices, however it seems to occur occasionally during this population
<b>Marx et al<sup>11</sup></b>	2001	Tamil Nadu	CSS	1947	18-40	04	More analysis is required to see the extent to that HCV infection is related to the utility of contaminated injection instrumentality in health-care settings in developing countries
<b>Mittal et al<sup>12</sup></b>	2012	Uttarakhand	CSS	495	21-65	01 week	The results indicate an intermediate level of endemicity of HBV and HCV infection during this region of Uttarakhand. Some freelance risk factors like intromission, interfamilial transmission, and visits to unregistered practitioners were known
<b>Pandit et al<sup>13</sup></b>	2004	Gujarat	CSS	2080	NA	05	A low average range of injections per head per annum within the community. Serious problems relating to injection safety got to be self-addressed desperately. There's a desire to develop native pointers for injection usage and implement a community-based program for the folks
<b>Prathiban et al<sup>14</sup></b>	2002	South India	Cohort study	3115	15-40	28	It is the primary report from the Republic of India of a successful plan to analyze the speed of vertical/perinatal transmission of HCV from infected mothers to their kids by a prospective longitudinal follow-up study
<b>Patel et al<sup>15</sup></b>	2016	Tamil Nadu	CSS	541	31-46	6	Residual gaps in HCV information and continued

Continued.

Author (citation)	Year of data collection	Study site	Study design	Study population	Age group (years)	Study duration (months)	Conclusion
							negative perceptions associated with interferon-based medical aid highlight the requirement to scale-up academic initiatives. Readiness for HCV treatment was notably low among HIV/HCV co-infected and older PWID, accenting the importance of tailored treatment ways
<b>Sarkar et al<sup>18</sup></b>	2004	West Bengal	CSS	228	15-55	01	HIV was found to be associated considerably with the age of the injectors and the period of injecting practices. The study disclosed the epidemic of HIV and hepatitis C among IDU populations at this bordering district of the state for the primary time that needs imperative intervention at native, national, and international levels
<b>Singh et al<sup>20</sup></b>	1998	Delhi	Cohort study	164	10-50	48	These infections were presumably non-inheritable through the re-use of needles by native medical and paramedical practitioners for administering anti-leishmanial medicine. This trend, if not checked now, could have forceful consequences within the horizontal transmission of HIV in the province
<b>Solomon et al<sup>23</sup></b>	2006	Whole India	CSS	26447	11-50	15	RDS was ready to apace establish at nominal price a considerable range of unaware and viremic HIV-infected and HCV-infected people UN agency were presently not being reached by existing programs and UN agency were at high risk for transmission
<b>Trickey et al<sup>24</sup></b>	2014	Punjab	CSS	5543	21-50	12	Lower socioeconomic score and the next proportion having ever used opium/bhuki were related to a household's range of anti-HCV+ members. Anti-HCV+ clusters inside households and villages in geographical area, India. This information ought to be accustomed inform screening efforts
<b>Verma et al<sup>25</sup></b>	2012	Haryana	CSS	7533	0 to $\geq 70$	2 weeks	The study emphasizes the requirement for public awareness campaigns at varied levels and also the bar of HCV infection. It conjointly suggests

Continued.

Author (citation)	Year of data collection	Study site	Study design	Study population	Age group (years)	Study duration (months)	Conclusion
							the requirement to develop and strengthen the analysis methodology for the integrated disease surveillance project (IDSP)
<b>Dutta et al<sup>4</sup></b>	2018	West Bengal	Cohort study	777	0-40	60	The study indicated that young adults between the ages of 10-14 years and feminine and feminine had the next likelihood of HCV by migrated to state through transmission from neighboring countries
<b>Kumar et al<sup>5</sup></b>	2018	Uttar Pradesh	CCS	9340	0 to $\geq 60$	08	HCV infection preponderantly affects young adults that is thanks to an accumulative risk of exposure with increasing age. Infection roughly equally distributed in each gender
<b>Kumar et al<sup>8</sup></b>	2006	New Delhi	Cohort study	8130	17 $\geq$ 35	26	Recorded 1.03% prevalence of hepatitis C in pregnant women. The case identification and explicit designing, routine screening not a viable possibility in our resource-poor setting
<b>Lole et al<sup>9</sup></b>	2003	Whole India	CCS	149	NA	6	Sequencing the 5_NCR could differentiate HCV types, whereas classification at the level of subtype was possible with sequence analysis of the core region
<b>Prakash et al<sup>16</sup></b>	2017	Uttar Pradesh	Cohort study	404	0-75	33	Sequencing the 5_NCR could differentiate HCV types, whereas classification at the extent of subtype was potential with sequence analysis of the core region
<b>Rajani et al<sup>17</sup></b>	2008	New Delhi	Cohort study	600	0 to $\geq 40$	12	HCV infection is predominantly a sickness of young adults that is because of the additive risk of exposure with increasing age. However, infection in kids is explained by the mother to baby transmission. Most of the HCV-infected patients are unaware of their clinical standing and thus the sickness could also be under-reported
<b>Singh et al<sup>21</sup></b>	1999	Uttar Pradesh	CSS	240	15-50	6	This pilot study provides a sign that sexually transmitted and blood-borne infections square measure extremely rife in jail premises and pose a threat of fast unfold of those infections through IVDU and sexual practice

Continued.

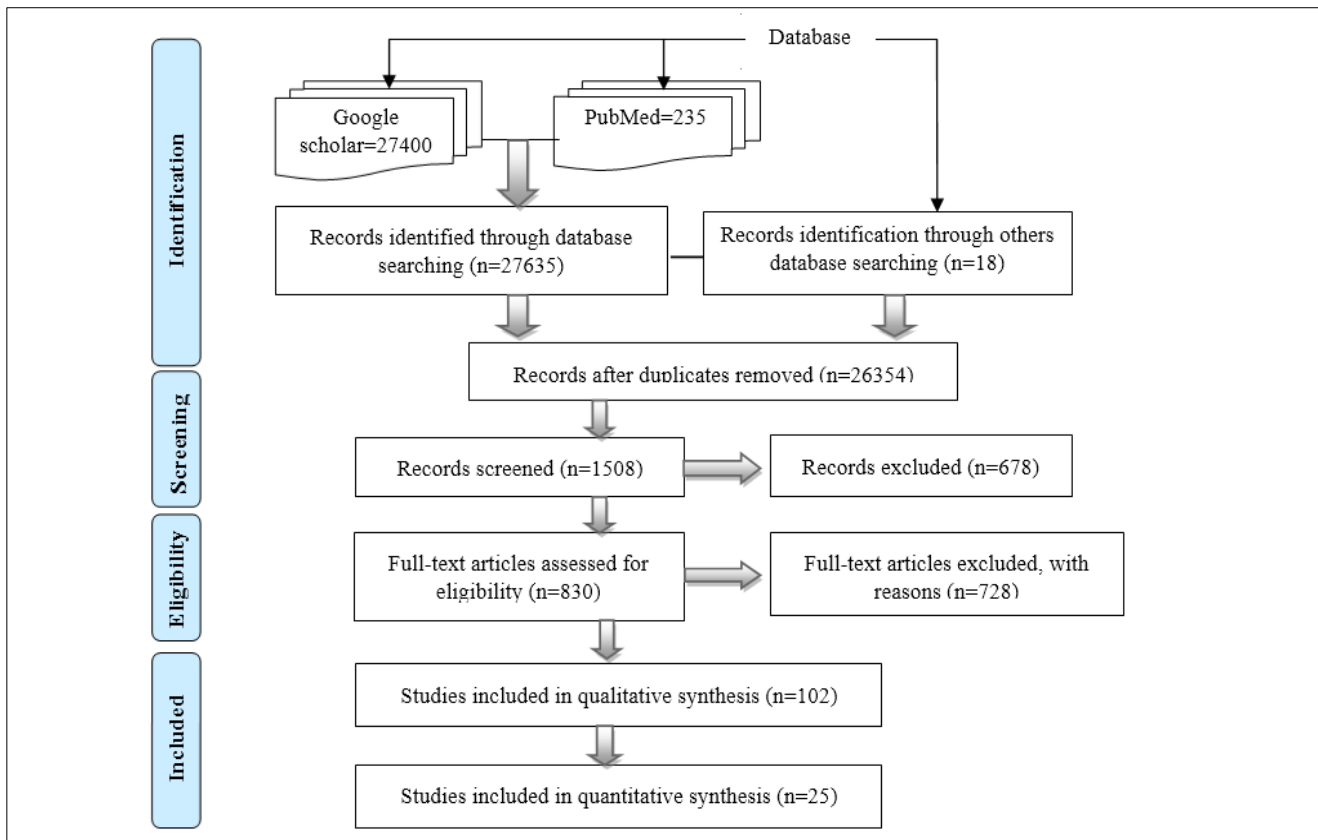
Author (citation)	Year of data collection	Study site	Study design	Study population	Age group (years)	Study duration (months)	Conclusion
Soin et al <sup>22</sup>	2014	Punjab	Cohort study	262	41-60	24	The high prevalence of HCV infection in patients on hemodialysis emphasizes, In the chronic nephropathy patients square measure extremely exposed to HCV infection. These patients also are incessantly increasing the source/ reservoir of HCV infection in our population
Barua et al <sup>1</sup>	2006	Nagaland	CSS	426	18≥40	12	To conclude, though the acquisition of HCV by sexual route might not be efficient as the epithelial duct route, the study indicates the presence of sexual transmissibility of HCV among FSWs with speculative behavior
Singh et al <sup>19</sup>	2015	Punjab	Cohort study	829	20-25	12	The reported 5.88% rate of perinatal transmission of this study shows that this is often not an uncommon route of transmission of HCV within the Malwa region of geographical area. However, a lot of studies square measure desperately required to grasp the precise extent and alternative aspects of this route of transmission to forestall additional unfold
Choudhary et al <sup>2</sup>	2013	Uttar Pradesh	Cohort study	28395	NA	12	Estimated overall prevalence of HCV 1.02 severally. Blood continues to be one of all the most sources of transmission of those diseases

CSS=cross sectional study, NA=not available, HCV=hepatitis C virus

**Table 2: Numbers of population group-wise.**

Sl. no.	Groups of population	No. of studies	Number of population	Percentage (%)	Author's contribution
1	General population	7	56253	54	Choudhary et al <sup>2,3</sup> , Lole et al <sup>9</sup> , Pandit et al <sup>13</sup> , Singh et al <sup>21</sup> , Tricky et al <sup>24</sup> , Verma et al <sup>25</sup>
2	Underprivileged population	4	6105	6	Garg et al <sup>6</sup> , Kar et al <sup>7</sup> , Mark et al <sup>10</sup> , Mark et al <sup>11</sup>
3	Pregnant women	3	12074	12	Kumar et al <sup>8</sup> , Prathiban et al <sup>14</sup> , Singh et al <sup>19</sup>
4	Associated risk patient	5	2207	2	Dutta et al <sup>4</sup> , Prakash et al <sup>16</sup> , Rajani et al <sup>17</sup> , Singh et al <sup>20</sup> , Soin et al <sup>22</sup>
5	Risk behavior groups	3	27101	26	Barua et al <sup>1</sup> , Sarkar et al <sup>18</sup> , Solomon et al <sup>23</sup>





**Figure 1: Flow chart of data collection followed PRISMA guidelines.**

## DISCUSSION

In this literature review, we include the 25 most relevant studies on the topic from different geographical regions in India. All studies have been done on the transmission of hepatitis C and affected community in different parts of India data of cultural impact, behavior, associated with others disease and also most affective group by hepatitis C. the overview of hepatitis C infection in Uttar Pradesh, Bihar, West Bengal, Tamil Naidu, Delhi, Punjab, Odisha, Gujarat, Uttarakhand, Nagaland included in this review. The prevalence of HCV infection is known to differ according to different geographical areas and among the general population and specific risk groups such as FSW.<sup>1</sup> Although prevalence and incidence studies of HCV have been carried out among different high-risk behavior groups such as MSM, blood donors, injection drugs user (IDU), etc. In the last 10 years increasing trends of single needle is re-used repeatedly by the multipurpose rural health workers, IDU, female commercial sex workers (in metro cities Delhi, Mumbai, Chennai, etc.) and tattooing to assess the prevalence of HCV infection and the possibility of transmission of HCV and associated risk factors among them.<sup>1</sup> Observation during the investigation of Kar et al in tribal area Odisha young women and adolescent girls get tattoos by non-disposable metallic needles were used on multiple individuals in a group without any practice of antiseptic use.<sup>7</sup>

## CONCLUSION

Viral hepatitis imposes a major healthcare burden in India. continue to upgrade sanitary and hygienic conditions can help tackle the problem associated with Hepatocellular disease, liver disorder, and chronic hepatitis, which can lead to ensuing complications like development of cirrhosis of liver, a multipronged approach of active screening, adequate treatment, universal vaccination against HCV and educational counseling can help decrease the burden of liver diseases associated with HCV infection in India. HCV infection is largely asymptomatic; hence, most of the infected persons are unaware of their HCV status. HCV screening for blood donor should mandatory, is possibly the best such identifier. This is practicable through a challenging task shift in the healthcare sector, with the diagnosis and treatment of HCV infection moving from the hands of hepatologists into those of internists and finally of non-specialist doctors. India's government has launched a national viral hepatitis control program.

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